

**THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

RED ROCK ANALYTICS, LLC,	§	
	§	
v.	§	CASE NO. 2:17-CV-101-RWS-RSP
	§	
SAMSUNG ELECTRONICS CO., LTD.,	§	
et al.	§	
	§	

**CLAIM CONSTRUCTION
MEMORANDUM AND ORDER**

On April 3, 2018, the Court held a hearing to determine the proper construction of disputed claim terms in United States Patent No. 7,346,313. Having reviewed the arguments made by the parties at the hearing and in their claim construction briefing (Dkt. Nos. 93, 99 & 100),¹ having considered the intrinsic evidence, and having made subsidiary factual findings about the extrinsic evidence, the Court hereby issues this Claim Construction Memorandum and Order. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

¹ Citations to documents (such as the parties' briefs and exhibits) in this Claim Construction Memorandum and Order refer to the page numbers of the original documents rather than the page numbers assigned by the Court's electronic docket unless otherwise indicated.

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I. BACKGROUND

Plaintiff Red Rock Analytics, LLC (“Plaintiff” or “Red Rock”) has alleged infringement of United States Patent No. 7,346,313 (“the ’313 Patent”) by Defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Semiconductor, Inc., and Samsung Austin Semiconductor, LLC (collectively, “Defendants”).

The ’313 Patent, titled “Calibration of I-Q Balance in Transceivers,” issued on March 18, 2008, bears a filing date of March 4, 2003, and claims priority to a provisional application filed March 4, 2002. *See* Dkt. No. 93, Ex. A, Jan. 31, 2017 Certificate of Correction (p. 25 of 25 in Ex. A). Plaintiff submits that the patent-in-suit relates to wireless communications and “how to calibrate for gain imbalances that cause errors in transceiver communications if not negated.” Dkt. No. 93 at 1. The Abstract of the ’313 Patent states:

Transceivers using direct conversion between baseband and RF have become popular for low-cost designs. Bandwidth-efficient modulations employ information on both phases of the carrier, and for high-order signaling alphabets, it becomes problematic to realize Direct-Conversion transceivers for which adequate gain balance between I and Q channels throughout the transmit and receive chains. For heterodyne transceivers I-Q balance is often less of an issue, by contrast, because most of the required gain operates at an Intermediate Frequency. In both cases, the trend toward lower supply voltages further exacerbates this problem because of the poorer control of analog parameters at low voltage. The present invention addresses this difficulty via a calibration method and system in which a calibration signal is generated in the transmit stage and injected into the receive stage so that any mismatches in gain can be observed and corrected.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties’ arguments and facilitating discussion. Those preliminary constructions are noted below within the discussion for each term. At the April 3, 2018 hearing, the parties addressed all of the disputed terms. In some

instances, one party agreed with or was amenable to the Court's preliminary construction, as noted below within the discussion for each term.

II. LEGAL PRINCIPLES

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim construction is clearly an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). “In some cases, however, the district court will need to look beyond the patent’s intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period.” *Teva*, 135 S. Ct. at 841 (citation omitted). “In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the ‘evidentiary underpinnings’ of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.” *Id.* (citing 517 U.S. 370).

To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See Phillips*, 415 F.3d at 1313; *see also C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*,

415 F.3d at 1312–13; *accord Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term’s context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can aid in determining the claim’s meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term’s meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

“[C]laims ‘must be read in view of the specification, of which they are a part.’” *Id.* at 1315 (quoting *Markman*, 52 F.3d at 979). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *accord Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor’s lexicography governs. *Id.* The specification may also resolve the meaning of ambiguous claim terms “where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone.” *Teleflex*, 299 F.3d at 1325. But, “[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.” *Comark Commc’ns, Inc. v. Harris*

Corp., 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); accord *Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc. v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) (“As in the case of the specification, a patent applicant may define a term in prosecuting a patent.”). “[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance.” *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985).

Although extrinsic evidence can be useful, it is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Phillips*, 415 F.3d at 1317 (citations and internal quotation marks omitted). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert’s conclusory, unsupported assertions as to a term’s definition are entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is “less reliable than the patent and its prosecution history in determining how to read claim terms.” *Id.*

The Supreme Court of the United States has “read [35 U.S.C.] § 112, ¶ 2 to require that a patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig*

Instruments, Inc., 134 S. Ct. 2120, 2129 (2014). “A determination of claim indefiniteness is a legal conclusion that is drawn from the court’s performance of its duty as the construer of patent claims.” *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus*, 134 S. Ct. 2120.

III. THE PARTIES’ STIPULATED TERMS

The parties reached agreement on constructions as stated in their January 30, 2018 P.R. 4-3 Joint Claim Construction Statement (Dkt. No. 87 at Ex. A) and in their briefing (Dkt. No. 93 at 3–4). Those agreements are set forth in Appendix A to the present Claim Construction Memorandum and Order.

IV. CONSTRUCTION OF DISPUTED TERMS

A. “and which in turn”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“and also”	“and then in sequence”

Dkt. No. 87, Ex. B at 1; Dkt. No. 93 at 4; Dkt. No. 99 at 1; Dkt. No. 107, P.R. 4-5(d) Joint Claim Construction Chart at 5. The parties submit that this term appears in asserted Claims 1, 7, 16, 22, and 32. Dkt. No. 87, Ex. B at 1; Dkt. No. 93 at 4; Dkt. No. 99 at 1.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “and then.” At the hearing, Defendants agreed with the Court’s preliminary construction.

(1) The Parties’ Positions

Plaintiff argues that whereas the parties agree that these apparatus claims “require[] a calibration cycle that (1) determines transmitter I-Q gain settings, and (2) determines receiver

I-Q gain settings,” Defendants incorrectly “propose[] an additional limitation requiring the calibration cycle to do these two things sequentially in a specific order.” Dkt. No. 93 at 4. Plaintiff argues that “[b]ecause these two calibrations are performed ‘independently,’ their order does not matter.” *Id.* at 6. Plaintiff also cites disclosure in the specification that the order is “immaterial.” *Id.* at 7 (quoting ’313 Patent at 6:6–8). As to the prosecution history, Plaintiff submits that “[t]he order of determining I-Q gain settings was never discussed.” Dkt. No. 93 at 9. Further, Plaintiff argues that Defendants are affiliated with “Unified Patents,” an entity that filed an *Inter Partes* Review petition in which Unified Patents submitted an expert declaration opining that “this limitation should not be narrowly limited to a specific order (i.e., determining transmitter I-Q gain settings prior to receiver I-Q gain settings).” *Id.* at 10 (quoting *id.*, Ex. D, June 7, 2017 Williams Decl. at ¶ 77) (emphasis omitted). Finally, Plaintiff argues that Defendants’ invalidity contentions include an indefiniteness assertion in which Defendants contend that construing “which in turn” to impose an order would be “inconsistent” with the “independently calibrate” limitation. Dkt. No. 93 at 11 (citing *id.*, Ex. G, Defs.’ First Supplemental Invalidity Contentions at 20).

Defendants respond that their proposed construction “is correct because: (1) it is the plain and ordinary meaning; and (2) the specification is consistent with this ordinary meaning, describing it as the ‘preferred’ method of performing the claimed calibration cycle.” Dkt. No. 99 at 1. Defendants emphasize that “no attempt was made by the patentee to act as a lexicographer and define it to have a particular meaning.” *Id.* at 2. Defendants also submit that the “independently calibrate” limitation is separate and distinct from the “calibration cycle” limitation in which the disputed term appears. *Id.* at 3.

Plaintiff replies that “[d]ictionaries cannot trump the intrinsic record, which plainly indicates that the sequence of determining calibration is not critical.” Dkt. No. 100 at 1. Plaintiff urges that the phrase “which in turn” can have a conjunctive meaning rather than imposing any temporal limitation. *Id.* at 2.

(2) Analysis

“As a general rule, ‘[u]nless the steps of a method [claim] actually recite an order, the steps are not ordinarily construed to require one.’” *Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398 (Fed. Cir. 2014) (quoting *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1342 (Fed. Cir. 2001)); see *Avago Techs. Gen. IP (Singapore) Pte Ltd. v. Asustek Computer, Inc.*, No. 15-CV-04525-EMC, 2016 WL 3029674, at *12 (N.D. Cal. May 27, 2016) (noting case law supporting, and absence of any case law refuting, that “order can be required by a system/apparatus claim”).

Courts apply a two-part test to determine whether a particular order of steps is required: “First, we look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written,” and “[i]f not, we next look to the rest of the specification to determine whether *it* directly or implicitly requires such a narrow construction.” *Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369–70 (Fed. Cir. 2003) (citation omitted).

Claim 1 of the ’313 Patent, for example, recites (emphasis added):

1. A transceiver system for transmitting and receiving data using both I and Q channels, comprising:
 - a transmit chain;
 - a receive chain; and
 - a calibration subsystem comprising a signal path for injecting a calibration RF signal, generated in response to and as a function of a signal generated through the transmit chain, into the receive chain of the transceiver in order to independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety;

wherein the calibration RF signal includes a calibration cycle, and the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator while holding receive I-Q gain settings constant, *and which in turn* determines receiver I-Q gain settings which minimizes [*sic*] the observable indicator while holding the transmit I-Q gain settings constant.

Plaintiff argues that “[b]ecause these two calibrations are performed ‘independently,’ their order does not matter.” Dkt. No. 93 at 6. The claim indeed recites a limitation of “independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety,” but Plaintiff has not shown how the “independence” of calibration necessarily bears upon the order of calibration. The other claims at issue, namely Claims 7, 16, 22, and 32, are similar in this regard.

“In some cases,” as is the case here, “the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips*, 415 F.3d at 1314. The meaning of the phrase “in turn” plainly requires that the determinations at issue be performed in the order recited. Thus, the claims “actually recite an order.” *Mformation*, 764 F.3d at 1398 (citation omitted); *see Avago*, 2016 WL 3029674, at *12 (quoted above).

This understanding is confirmed by extrinsic dictionary definitions. *See* Dkt. No. 99, Ex. 2, *Oxford Living Dictionaries* (“in turn”: “In succession; one after the other.”); *see also id.*, Ex. 3, *Webster’s New World Dictionary* 1441 (3d college ed. 1988) (“in turn”: “in proper sequence or succession”); *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1382 (Fed. Cir. 2008) (“When the intrinsic evidence is silent as to the plain meaning of a term, it is entirely appropriate for the district court to look to dictionaries or other extrinsic sources for

context—to aid in arriving at the plain meaning of a claim term.”).² Plaintiff has not presented any evidence that the term “and which in turn” or the phrase “in turn” has any other plain meaning.³

Plaintiff has cited disclosure in the specification that “whether the transmit or receive chain is adjusted first is immaterial”:

The overall calibration process preferably proceeds by minimizing the imbalance observable with respect to gain adjustments in the transmit chain while holding the gains in the receive chain fixed, *then* minimizing the imbalance observable with respect to gain adjustments in the receive chain while holding the gains in the transmit chain fixed. *Of course, whether the transmit or receive chain is adjusted first is immaterial.* Furthermore, the process could alternate several times if required, for example, after initial application of power to the transceiver.

’313 Patent at 6:1–10 (emphasis added).⁴ Further, the Summary of the Invention states:

In one embodiment, the calibration RF signal includes a calibration cycle, and further includes using the calibration cycle so as to determine the transmitter I-Q gain settings so as to minimize the observable indicator while holding the receive I-Q gain settings constant, *and* determining the receiver I-Q gain settings so as to minimize the observable indicator while holding the transmit I-Q gain settings constant.

* * *

In one embodiment the calibration RF signal includes a calibration cycle, wherein the method further includes using the calibration cycle to determine the transmitter I-Q gain settings which minimize the observable indicator while holding the receive I-Q gain settings constant, *and* determining the receiver I-Q

² Defendants have also cited usage of the phrase “in turn” in other, unrelated patents (*see* Dkt. No. 99 at 2–3), but such evidence is of little, if any, persuasive weight in the present case. *See e.Digital Corp. v Futurewei Techs., Inc.*, 772 F.3d 723, 727 (Fed. Cir. 2014) (“claims of unrelated patents must be construed separately”).

³ Plaintiff has cited judicial decisions that use the phrase “in turn,” but Plaintiff has not shown how those instances of judicial usage amount to evidence of a definition of the phrase. *See In re Amy Unknown*, 701 F.3d 749, 763 (5th Cir. 2012); *see also Lion Mfg. Corp. v. Kennedy*, 330 F.2d 833, 839 (D.C. Cir. 1964).

⁴ Plaintiff has noted that a similar disclosure appears in the provisional patent application to which the ’313 Patent claims priority. *See* Dkt. No. 93, Ex. B at RRA00000270.

gain settings which minimizes [*sic*] the observable indicator while holding the transmit I-Q gain settings constant.

Id. at 3:5–12 & 3:63–4:3 (emphasis added); *see id.* at 8:49–9:16 & 10:24–42.

Despite these disclosures in the specification, however, “[t]he patentee chooses the language and accordingly the scope of his claims.” *Helmsderfer*, 527 F.3d at 1383; *see Schoenhaus v. Genesco, Inc.*, 440 F.3d 1354, 1359 (Fed. Cir. 2006) (“[W]here a patent specification includes a description lacking a feature, but the claim recites that feature, the language of the claim controls.”) (citing *Unique Concepts, Inc. v. Brown*, 939 F.2d 1558, 1562 (Fed. Cir. 1991)); *see also Intamin Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, 1337 (Fed. Cir. 2007) (“A patentee may draft different claims to cover different embodiments.”); *Oak Tech., Inc. v. Int’l Trade Comm’n*, 248 F.3d 1316, 1328–29 (Fed. Cir. 2001) (as to term “a cyclic redundancy checker for detecting errors in said assembled data *after* correction of said data by said correction circuitry,” finding “sequential limitation is imposed by the claim language itself”) (emphasis added). Thus, because the disputed term explicitly requires an order, the Court’s analysis need not reach the second step of *Altiris*, namely to “look to the rest of the specification to determine whether *it* directly or implicitly requires such a narrow construction.” *Altiris*, 318 F.3d at 1369–70 (citation omitted).

Also of note, Claim 38 recites, in relevant part (emphasis added): “wherein the calibration RF signal includes a calibration cycle, and further including using the calibration cycle so as to determine transmitter I-Q gain settings so as to minimize an observable indicator while holding receive I-Q gain settings constant, *and* determining receiver I-Q gain settings so as to minimize the observable indicator while holding transmit I-Q gain settings constant.” This usage of the word “and” instead of the term “and which in turn” is notable and at least somewhat further supports understanding the term “and which in turn” as requiring an order. *See Curtiss-*

Wright Flow Control Corp. v. Velan, Inc., 438 F.3d 1374, 1381 (Fed. Cir. 2006) (citations omitted) (“Different claims with different words can, of course, define different subject matter within the ambit of the invention.”).⁵

Plaintiff has cited disclosure of a “pulses embodiment” that Plaintiff argues is recited in dependent Claims 11, 17, 26, and 33 (*see* ’313 Patent at 8:48–9:6), but Plaintiff has not shown that the use of these “pulses” is necessarily inconsistent with the sequence in which above-reproduced Claim 1, for example, recites “determines transmitter I-Q gain settings” and “determines receiver I-Q gain settings.” Moreover, “[w]hile it is true that dependent claims can aid in interpreting the scope of claims from which they depend, they are only an aid to interpretation and are not conclusive.” *See N. Am. Vaccine, Inc. v. Am. Cyanamid Co.*, 7 F.3d 1571, 1577 (Fed. Cir. 1993) (“The dependent claim tail cannot wag the independent claim dog.”).

Plaintiff has cited arguments asserted by Unified Patents Inc. in a Petition for *Inter Partes* Review (“IPR”) in IPR2017-01490, as well as the opinions set forth in the accompanying Declaration of Tim A. Williams, Ph.D. in Support of Petition for *Inter Partes* Review:

To the extent that the Patent Owner argues that this limitation is narrowly limited to a specific order (i.e., determining transmitter I-Q gain settings prior to receiver I-Q gain settings), that argument is not supported by the intrinsic record. EX1004 [(Williams Decl.)], ¶ 77. The ’313 Patent describes an embodiment that determines the gain settings for the transmitter and “then” for the receiver, but nothing in the specification requires this ordering. EX1001 [(’313 Patent)], 6:1–8; EX1004, ¶ 77. To the contrary, the ’313 Patent expressly states that, “[o]f course, whether the transmit or receive chain is adjusted first is *immaterial*.” EX1001, 6:1–8 (emphasis added). There is also no prosecution history disclaimer that would limit the claims to a particular order. EX1002. Thus, a person of ordinary skill would understand that, under the broadest reasonable interpretation,

⁵ *But see id.* (“On the other hand, claim drafters can also use different terms to define the exact same subject matter. Indeed this court has acknowledged that two claims with different terminology can define the exact same subject matter.”)

this limitation is not limited to a specific order and that it is disclosed in [the] Warner [reference]. EX1004, ¶ 77.

Dkt. No. 93, Ex. C, June 8, 2017 Petition for *Inter Partes* Review at 42.

77. It is my opinion that this limitation should not be narrowly limited to a specific order (i.e., determining transmitter I-Q gain settings prior to receiver I-Q gain settings). The '313 Patent describes an embodiment that determines the gain settings for the transmitter and “then” for the receiver, but I found nothing in the specification requires this ordering. EX1001 [(‘313 Patent)], 6:1–8. To the contrary, the '313 Patent states that, “[o]f course, whether the transmit or receive chain is adjusted first is immaterial.” *Id.* I also saw nothing in the prosecution history that suggests limiting the claims to a particular order. *See* EX1002. Thus, in my opinion, a person of ordinary skill would understand that, under the broadest reasonable interpretation, this limitation is not limited to a specific order and that it is disclosed in [the] Warner [reference].

Id., Ex. D, June 7, 2017 Williams Decl. at ¶ 77.

Plaintiff has not adequately demonstrated that the statements by Unified Patent or its expert are attributable to Defendants. *See* Dkt. No. 99, Ex. 8, Petitioner’s Reply to Patent Owner’s Preliminary Response at 1 (“Unified does not communicate with any companies regarding potential IPRs and does not discuss whether it will (or will not) file an IPR with any companies prior to filing. Petitioner has not communicated with any unnamed party relating to IPR2017-01490, and no party other than Petitioner directed, controlled, participated in, assisted with, or funded IPR2017-01490.”); *see also* Dkt. No. 93, Ex. E, Sept. 28, 2017 Patent Owner’s Unredacted Preliminary Response at 42–58. Further, even if these statements are attributable to Defendants, Plaintiff has not shown that any estoppel applies. Indeed, the Patent Trial and Appeal Board (“PTAB”) evidently rejected the arguments presented by Unified Patents because the PTAB denied the IPR petition.

Turning to Defendants’ contentions in the present case, Plaintiff has submitted a page of an Invalidity Chart in which Defendants incorporated-by-reference the Unified Patents IPR Petition. *Id.*, Ex. F, Invalidity Chart at 1. Plaintiff has not shown, however, that this

incorporation-by-reference necessarily amounts to an adoption of every statement in the IPR Petition for purposes of the present case.

Alternatively and in addition, Plaintiff has not shown that statements made in the IPR proceedings in the context of the “broadest reasonable interpretation” standard are necessarily relevant under the *Phillips* claim construction standard that applies in the present case. *See In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1276–78 (Fed. Cir. 2015), *aff’d*, *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131 (2016).

Plaintiff has also emphasized that, in the present litigation, Defendants have contended as follows as to the term “and which in turn”:

This term renders the claim indefinite. For example, it is not clear whether this term requires a particular order of operations. Additionally or alternatively, this phrase appears to require the receiver calibration to be dependent upon or a function of the transmitter calibration, which is inconsistent with earlier claim language requiring the calibrations to be “independent.” The specification does not use this phrase at all, let alone in the context of receiver I-Q gain calibration. *See, e.g.*, 3:9–12, 3:67–4:3.

Dkt. No. 99, Ex. 9, Sept. 28, 2017 Defs.’ First Supplemental Invalidity Contentions at 20. To the extent, if any, that this contention is binding, and to whatever extent this contention might be interpreted as precluding any sequential requirement, Defendants have persuasively pointed out their accompanying introductory statement that “Samsung’s invalidity contentions are based on its current understanding of the asserted claims as applied by Red Rock in its infringement contentions.” *Id.* at 3.

In sum, as discussed above, a sequential requirement is readily apparent in the disputed term itself, and Plaintiff has not demonstrated that Defendants have made any binding statement or concession to the contrary.

The Court therefore hereby construes “**and which in turn**” to mean “**and then.**”

B. “independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary; plain and ordinary meaning applies. Alternatively: “calibrate the I-Q gain balance of the entire transmit chain independently from the I-Q gain balance of the entire receive chain”	“independently calibrate the I-Q gain balance of both the transmit and receive chains in their entirety, which includes the up-conversion and down-conversion mixing elements”

Dkt. No. 87, Ex. B at 1–2; Dkt. No. 93 at 12; Dkt. No. 99 at 6; Dkt. No. 107 at 4. The parties submit that this term appears in asserted Claims 1 and 38. Dkt. No. 87, Ex. B at 1–2; Dkt. No. 93 at 12.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “calibrate the I-Q gain balance of the entire transmit chain independently from the I-Q gain balance of the entire receive chain, and calibrate the I-Q gain balance of the entire receive chain indepe[n]dently from the I-Q gain balance of the entire transmit chain” (Reject proposal to include “up-conversion and down-conversion mixing elements”). At the hearing, Plaintiff agreed with the Court’s preliminary construction.

(1) The Parties’ Positions

Plaintiff argues:

If the transmit chain includes an up-conversion mixer, then that mixer is part of “the entire transmit chain” and would be included in the calibration. If the receive chain includes a down-conversion mixer, then that mixer is part of “the entire receive chain” and would be included in the calibration. However, Red Rock disputes Samsung’s attempt to add a new claim limitation *requiring* “up-conversion and down-conversion mixing elements” to be present in the claimed transmit and receive chains.

Dkt. No. 93 at 13.⁶

Defendants respond that “[t]he specification distinguishes the invention from the prior art on the basis that, unlike the prior art, the invention includes within the I-Q gain calibration process the gains attributable to the up-conversion and down-conversion mixing elements.” Dkt. No. 99 at 8. Defendants argue that “Samsung’s construction is not importing limitations from the specification, but is instead giving meaning to the word ‘entirety’ in the context of this claim element that is directed to calibration of the transmit and receive chains.” Dkt. No. 99 at 11.

Plaintiff replies that “the ’313 Patent contemplates ‘alternative transceiver structures’ other than the two types that Samsung identified [(‘direct-conversion’ and ‘heterodyne’)].” Dkt. No. 100 at 4 (citing ’313 Patent at 5:33–36 & 6:53–56).

(2) Analysis

Claims 1 and 38 of the ’313 Patent recite (emphasis added):

1. A transceiver system for transmitting and receiving data using both I and Q channels, comprising:
 - a transmit chain;
 - a receive chain; and
 - a calibration subsystem comprising a signal path for injecting a calibration RF signal, generated in response to and as a function of a signal generated through the transmit chain, into the receive chain of the transceiver in order to *independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety*;wherein the calibration RF signal includes a calibration cycle, and the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator while holding receive I-Q gain settings constant, and which in turn determines receiver I-Q gain settings which minimizes [*sic*] the observable indicator while holding the transmit I-Q gain settings constant.

* * *

⁶ Plaintiff has also cited deposition testimony of one of Defendants’ engineers regarding technical issues. Dkt. No. 93, Ex. H. This testimony addressed the meanings of terms in the abstract, not necessarily in the context of the ’313 Patent. *See id.* Upon review, this extrinsic evidence carries no significant weight in the analysis of the present claim construction dispute.

38. A method of calibrating a transceiver system for transmitting and receiving data using both I and Q channels and including a transmit chain and a receive chain[,] the method comprising[:]

injecting a calibration RF signal, generated in response to and as a function of a signal generated through the transmit chain, into the receive chain of the transceiver in order to *independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety*;

wherein the calibration RF signal includes a calibration cycle, and further including using the calibration cycle so as to determine transmitter I-Q gain settings so as to minimize an observable indicator while holding receive I-Q gain settings constant, and determining receiver I-Q gain settings so as to minimize the observable indicator while holding transmit I-Q gain settings constant.

Defendants have not demonstrated that these claims recite any “mixer” requirements, particularly as to the disputed term.⁷

The only explicit disclosures of “mixers” in the specification relate to Figures 1 and 2, and these Figures identify themselves as “Prior Art.” *See* ’313 Patent at 6:34–40 & 6:62–7:12. The specification states that “[t]he calibration technique described in this patent is applicable to any form of conversion between RF and baseband, and not limited to the conventional approach used as examples in the figures.” *Id.* at 6:46–56; *see id.* at 5:33–36 (“While motivated primarily to enable realization of direct-conversion transceivers, this calibration method can be applied to heterodyne-conversion or *alternative transceiver structures* which implement less of the required gain at baseband.”) (emphasis added).

Also, dependent Claims 3, 4, 40, and 41 refer to particular types of transceivers, namely “a direct-conversion transceiver” and “a heterodyne-conversion transceiver,” which weighs at least somewhat against reading specific transceiver component limitations into the independent claims. *See Phillips*, 415 F.3d at 1315 (“the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the

⁷ Also, the parties have not presented “transmit chain” or “receive chain” as disputed terms.

independent claim”); *see also Intamin*, 483 F.3d at 1335 (“An independent claim impliedly embraces more subject matter than its narrower dependent claim.”); *but see Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001) (“Claim differentiation, while often argued to be controlling when it does not apply, is clearly applicable when there is a dispute over whether a limitation found in a dependent claim should be read into an independent claim, and that limitation is the only meaningful difference between the two claims.”).

Defendants have cited various disclosures in the specification regarding including all relevant gains in the calibration process, such as the following:

While injection of DC calibration signals to calibrate the baseband transmit and receive gains is possible, the inclusion of this function presents a layout difficulty for critical circuitry. Furthermore, such signals would not provide *calibration of the effective conversion gains of the RF up-conversion and down-conversion mixer elements*.

The present invention is designed to improve the quality of transceivers operating with low voltage power supplies so as to support higher signaling alphabets. The calibration technique must be comprehensive in the sense of calibrating the transmit and receive chains independently and also *including all relevant gains in the calibration process*. Finally, the calibration process should place less design stress on the circuitry than would be required using commonly known alternate calibration approaches such as the ones described below.

* * *

The present invention is directed to a system . . . to support calibration independently of the I-Q gain balance of the both transmit and receive chains in their entirety, as required for proper operation among multiple users. This provides comprehensive I-Q gain balance

* * *

[I]n order to attain high accuracy in the I-Q gain balance, a calibration signal is applied to the baseband input of the transmit chain. This signal is amplified and converted to a signal at the transmit RF port as would be any transmit signal during normal operation. Thus, this transmit RF signal includes *all gains relevant to normal operation in the transmit chain*.

* * *

The extra circuitry required in FIGS. 3a and 3b [(Prior Art)] is not extensive, but this circuitry must be included in portions of the overall design in places which are typically sensitive to layout constraints. *Furthermore, the individual calibration of baseband gains in the transmit and receive chains does not include the conversion gains of the up-conversion and down-conversion mixing elements.* Since these conversion gains may not match in the I and Q channels, a comprehensive calibration technique is needed. *The present invention overcomes all of these difficulties.*

* * *

[T]his approach includes in the overall path of the calibration signal all paths used during normal operation, and therefore *all possible sources of I-Q gain imbalance in the transmit and receive chains.*

'313 Patent at 1:62–2:10, 5:20–27, 5:38–44, 7:60–8:2 & 8:43–47 (emphasis added); *see id.* at 5:53–57 (“this receive baseband signal includes all gains relevant to normal operation in the receive chain”). For example, Defendants argue that because no mixing elements are included in the prior art calibration illustrated in Figures 3a and 3b, the “present invention” described thereafter must account for mixing elements. Dkt. No. 99 at 8.

Defendants have emphasized the following statement by the Court of Appeals for the Federal Circuit in *Edwards Lifesciences LLC v. Cook Inc.*: “Although the construction of a claimed term is usually controlled by its ordinary meaning, we will adopt an alternative meaning if the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention.” 582 F.3d 1322, 1329 (Fed. Cir. 2009) (citations and internal quotation marks omitted); *see id.* at 1330 (“the specification frequently describes an ‘intraluminal graft’ as ‘the present invention’ or ‘this invention,’ indicating an intent to limit the invention to intraluminal devices”).

On balance, however, none of the disclosures cited by Defendants, such as those set forth above, has been shown to require construing the disputed term as involving “mixing elements” based on any of the above-cited principles in *Edwards Lifesciences* or any other principle. *See, e.g., Rambus Inc. v. Infineon Techs. AG*, 318 F.3d 1081, 1094 (Fed. Cir. 2003) (“[W]hile clear language characterizing ‘the present invention’ may limit the ordinary meaning of claim terms, such language must be read in context of the entire specification and the prosecution history”) (citation omitted). For example, although one of the above-reproduced disclosures refers to “the present invention” as overcoming difficulties of prior art with reference to mixing elements (’313 Patent at 7:60–8:2), it does not necessarily follow that the claimed invention is relevant only in the context of mixing elements. Indeed, this disclosure is immediately followed by a statement that “[t]his method applies to a direct-conversion transceiver, but could be applied to calibrate I-Q gain balance in the baseband portion of a conventional heterodyne transceiver as well, *or any other transceiver requiring I and Q channel gain balance.*” *Id.* at 8:2–6 (emphasis added).

Finally, Defendants assert: “There is no disclosure of the invention calibrating the entirety of a transmit or receive chain that does not include frequency conversion mixing elements. Indeed, the invention is repeatedly described as being implemented in direct conversion and heterodyne (IF) transceivers, both of which employ frequency conversion mixers.” Dkt. No. 99 at 10–11 (citing ’313 Patent at 2:27–28 (“The transceiver can be a direct-conversion transceiver or a heterodyne-conversion transceiver.”), 2:36–57, 3:26–51 & 4:11–35).

Defendants have not demonstrated that the use of “mixing elements” is inherent. Instead, the disputed term simply refers to calibration of whatever elements are present in the transmit and receive chains in a particular implementation. *See Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998) (“The claim construction inquiry . . . begins and ends in

all cases with the actual words of the claim.”); *see also Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014) (“[I]n all aspects of claim construction, ‘the name of the game is the claim.’”) (quoting *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)), *abrogated on other grounds by Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015).

Defendants have cited *Retractable Technologies, Inc. v. Becton, Dickinson and Co.*, which construed the term “body” as limited to a one-piece body in light of disclosures in the specifications, such as that “[i]n distinguishing prior art syringes comprised of multiple pieces, the specifications state that the prior art had failed to recognize a retractable syringe that ‘can be molded as one piece outer body.’” 653 F.3d 1296, 1305 (Fed. Cir. 2011). Here, by contrast, Defendants have not shown that the prior art was distinguished based on “mixing elements.”⁸ Instead, use of such mixing elements is a specific feature of particular disclosed embodiments that should not be imported into the claims. *See Comark*, 156 F.3d at 1187; *see also Phillips*, 415 F.3d at 1323.

The Court therefore expressly rejects Defendants’ proposal of requiring “mixing elements.” The Court hereby construes **“independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety”** to mean **“calibrate the I-Q gain balance of the entire transmit chain independently from the I-Q gain balance of the entire receive chain, and calibrate the I-Q gain balance of the entire receive chain independently from the I-Q gain balance of the entire transmit chain.”**

⁸ Substantially the same analysis applies to other authorities cited by Defendants. *See Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368–70 (Fed. Cir. 2003) (“the specification teaches that the invention as a whole, not merely a preferred embodiment, provides for play in the positioning of floor panels”); *see also Inpro II Licensing, SARL v. T-Mobile USA, Inc.*, 450 F.3d 1350, 1354–55 (Fed. Cir. 2006) (“the specification emphasizes the importance of a parallel connection in solving the problems of the previously used serial connection”).

C. “I-Q gain settings”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary; plain and ordinary meaning applies. Alternatively: “settings of signal amplification in the I-channel and/or Q-channel”	“settings of signal amplification in the I-channel and Q-channel, wherein such settings do not include filter coefficients”

Dkt. No. 87, Ex. B at 2–3; Dkt. No. 93 at 15; Dkt. No. 99 at 14; Dkt. No. 107 at 4. The parties submit that this term appears in asserted Claims 1, 7, 16, 22, 32, 38, 44, 59, and 69. Dkt. No. 87, Ex. B at 2; Dkt. No. 93 at 15; Dkt. No. 99 at 14.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “settings of signal amplification in the I channel and Q channel” (Reject proposal to exclude “filter coefficients” generally).

(1) The Parties’ Positions

Plaintiff argues that “Red Rock did not make a clear and unmistakable disclaimer in the IPR, and Samsung’s ‘and’ limitation contradicts the specification and finds no support in the claim language.” Dkt. No. 93 at 16. As to the IPR, Plaintiff argues that “Red Rock was distinguishing filter coefficients in the context of Warner’s collective calibration method and not all filter coefficients generally” *Id.* at 18. As to Defendants’ proposal of “and,” Plaintiff argues: “For example, if a signal going through the I channel experiences 20% more gain as compared to a signal in the Q channel, that imbalance can be calibrated (i) by decreasing the gain in the I channel to entirely remove the imbalance, (ii) by increasing the gain in the Q channel to entirely remove the imbalance, or (iii) by adjusting both channels by an appropriate amount to remove the imbalance.” *Id.* at 19.

Defendants respond that “[t]he parties dispute whether this limitation can encompass filter coefficients, a reading the Plaintiff expressly and unequivocally disclaimed before the Patent Trial and Appeal Board (‘PTAB’).” Dkt. No. 99 at 14. Defendants argue that “[n]owhere in its POPR [(Patent Owner Preliminary Response)] did Red Rock suggest that Warner’s filter coefficients are different from any other filter coefficients, and it makes no serious effort to do so in its brief.” *Id.* at 16. Further, Defendants argue that “it is standard grammatical practice to use the hyphen as a conjoiner (e.g., ‘ninety-nine’) rather than as a disjoiner (‘or’) as Red Rock does in its construction.” *Id.* at 17. Defendants submit that “[t]his ordinary meaning is confirmed by the specification, which consistently describes transceivers as having gain settings for both I and Q channels.” *Id.*

Plaintiff replies that “Samsung argues that Red Rock clearly and unmistakably disclaimed *all* filter coefficients, but Red Rock only distinguished *Warner’s* filter coefficients which fail to isolate gain settings.” Dkt. No. 100 at 5. In particular, Plaintiff argues that “Warner never determines any gain settings, and Warner never discloses a relationship between its filter coefficients and any I/Q gain settings.” *Id.* at 6.

(2) Analysis

Plaintiff has failed to demonstrate that “I-Q” should be interpreted as “I and/or Q.” Claim 1 of the ’313 Patent, for example, recites in part (emphasis added): “independently calibrate the *I-Q gain balance* of the both transmit and receive chains in their entirety”; and “the calibration cycle determines transmitter *I-Q gain settings* which minimize an observable indicator while holding receive *I-Q gain settings* constant.” A fair reading of the context in which the disputed term is used is that “I-Q gain settings” relate to both I and Q. This is consistent with disclosure in the specification of gains for both I and Q. *See, e.g.,* ’313 Patent at

8:62–64 (“The transmit I and Q gains are G_{TI} and G_{TQ} , respectively, while the receive I and Q gains are G_{RI} and G_{RQ} , respectively.”) & 10:24–27 (“The basic calibration operation comprises applying the test signal as the baseband transmit signal input, holding the receive *gains* fixed, and sequentially varying the difference in I- and/or Q-channel *gains* in the transmit chain.”) (emphasis added). At least one other district court has similarly interpreted a hyphenated term as conjunctive based on the context provided by intrinsic evidence. *See Meetrix IP, LLC v. Citrix Sys., Inc.*, No. 1:16-CV-1033-LY, 2017 WL 5986191, at *11 (W.D. Tex. Dec. 1, 2017) (“Finding no broad rule for either a conjunctive or disjunctive reading of the hyphen in ‘audio-video,’ the court looks to the intrinsic evidence.”).

Plaintiff has cited the following disclosure in the specification:

The varying of differential I-Q gains in the transmit and receive chains can be effected in many ways. It can be applied in a true differential manner, although this is not necessary and it is generally simpler to vary either the I or Q gain while holding the other fixed.

Id. at 10:42–47. Despite this disclosure that one of the gains could be varied while holding the other fixed, this does not demonstrate that the term “I-Q gain settings” could refer to only one gain or the other. Indeed, the foregoing disclosure involves both I gain and Q gain, even though one of them may be held fixed during a particular operation. Also, as Defendants have noted, Claim 7 recites “differential I-Q gain” as well as “I-Q gain settings,” so these two concepts appear to be distinct. Finally, in one instance the specification explicitly uses “I- *and/or* Q-channel gains” (*id.* at 10:24–27 (emphasis added)), which provides further support for reading the different term “I-Q gain settings” as having a different meaning.⁹

⁹ Plaintiff has cited this disclosure, arguing that “[t]he intrinsic evidence also states that the invention can vary the “I- *and/or* Q-channel gains.” Dkt. No. 100 at 7 (quoting ’313 Patent at 10:27). This disclosure, however, refers to “varying the *difference* in I- and/or Q-channel gains.” ’313 Patent at 10:26–27. This disclosure thus suggests that the gain of either the

As to whether Plaintiff disclaimed filter coefficients, Defendants have cited statements in the Patent Owner's Preliminary Response submitted by Plaintiff in response to the Unified Patents IPR petition. *See Aylus Networks Inc. v. Apple Inc.*, 856 F.3d 1353, 1362 (Fed. Cir. 2017) ("statements made by a patent owner during an IPR proceeding, whether before or after an institution decision, can be considered for claim construction and relied upon to support a finding of prosecution disclaimer").

In the Patent Owner's Preliminary Response, Plaintiff stated as follows regarding the "Warner" reference (United States Patent No. 6,940,916):

Warner discloses a system that sets tap coefficients for multiple finite impulse response (FIR) filters that are intended to collectively remove the effect of all transceiver impairments across a wide frequency band. There is no technique in Warner that calculates, or even isolates, I-Q gain settings, and filter coefficients are different than the claimed gain settings.

* * *

Warner's FIR filter coefficients are not gain settings for at least two reasons. First, the filter coefficients dictate the polynomial frequency response of a FIR filter, which is completely unrelated to gain settings. Second, and to the extent that Warner's filter coefficients are characterized as "calibration settings" that collectively negate transceiver impairments, these filter settings in Warner do not determine, or even isolate, I-Q gain settings.

Dkt. No. 99, Ex. 10, Sept. 28, 2017 Patent Owner's Redacted Preliminary Response at 2–3 & 25; *see id.* at 19 ("Warner's filter tap coefficients do not represent gains or amplitude levels of the I or Q channels . . .") & 24 (similar); *see also id.* at 25–29 ("I-Q gain settings are fundamentally different than filter tap coefficients. . . . This is an entirely different concept than the use of FIR filter tap coefficients to change the impulse response applied to an input signal.").

I channel or the Q channel could remain constant. Plaintiff has not demonstrated how this disclosure could allow for only one of the channels having a gain.

Defendants have submitted that Warner discloses various types of filters. Defendants have also argued that Plaintiff did not state that Warner’s filter coefficients are different from filter coefficients more generally. Nonetheless, Plaintiff’s statements were made specifically with regard to Warner and the “FIR filter coefficients.” *See id.*; *see also* Dkt. No. 93, Ex. E, Sept. 28, 2017 Patent Owner’s Unredacted Preliminary Response at iii, 15 & 27–28.

Defendants therefore have not shown any “clear and unmistakable” disclaimer as to filter coefficients in general. *Avid Tech., Inc. v. Harmonic, Inc.*, 812 F.3d 1040, 1045 (Fed. Cir. 2016) (“[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable.”) (citations and internal quotation marks omitted); *see id.* (“Where the alleged disavowal is ambiguous, or even ‘amenable to multiple reasonable interpretations,’ we have declined to find prosecution disclaimer.”) (citations omitted); *see also Omega Eng’g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) (“As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public’s reliance on *definitive* statements made during prosecution.”) (emphasis added); *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1332 (Fed. Cir. 2004) (“Because the statements in the prosecution history are subject to multiple reasonable interpretations, they do not constitute a clear and unmistakable departure from the ordinary meaning of the term . . .”).

Defendants have argued that Plaintiff’s statements regarding the particular features of Warner were distinct from Plaintiff’s statements distinguishing filter coefficients more generally. *See Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1374 (Fed. Cir. 2007) (“[A]n applicant’s argument that a prior art reference is distinguishable on a particular ground can serve as a disclaimer of claim scope even if the applicant distinguishes the reference on other grounds

as well.”). As discussed above, however, the statements regarding filter coefficients were framed in the context of Warner’s FIR filter coefficients. The Court therefore expressly rejects Defendants’ proposal of “wherein such settings do not include filter coefficients.”

The Court accordingly hereby construes **“I-Q gain settings”** to mean **“settings of signal amplification in the I channel and Q channel.”**

D. “baseband I-Q amplification subsystem”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
No construction necessary; plain and ordinary meaning applies. Alternatively: “one or more baseband amplifiers on the I and/or Q channels”	“one or more baseband amplifiers in each of the I and Q channels, wherein such amplifiers do not comprise digital filters”

Dkt. No. 87, Ex. B at 3; Dkt. No. 93 at 19; Dkt. No. 99 at 18; Dkt. No. 107 at 5–6. The parties submit that this term appears in asserted Claims 7, 16, 22, 32, 44, 59, and 69. Dkt. No. 87, Ex. B at 3; Dkt. No. 93 at 19; Dkt. No. 99 at 19.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “one or more baseband amplifiers on the I and Q channels, wherein any such amplifier does not comprise only digital filters.” At the hearing, Defendants were amenable to the Court’s preliminary construction.

(1) The Parties’ Positions

Plaintiff submits that “[t]he parties’ disputes for this term are similar to the disputes for the preceding ‘I-Q gain settings’ term.” Dkt. No. 93 at 20. Plaintiff argues that “Red Rock did not make a clear and unmistakable disclaimer and the intrinsic record clarifies that amplifiers are not required on both I and Q channels.” *Id.*

Defendants respond that “[t]he parties dispute whether digital filters can satisfy this limitation, a reading the Plaintiff expressly and unequivocally disclaimed before the PTAB.” Dkt. No. 99 at 19. Defendants also argue that Plaintiff’s alternative proposal should be rejected because “[t]his subsystem must provide ‘I-Q amplification,’ not merely ‘I amplification’ or ‘Q amplification.’” *Id.* at 20. Further, Defendants urge, “[t]he term ‘subsystem’ strongly suggests a group of components that work together to achieve their function.” *Id.*

Plaintiff replies that “Red Rock did not say that a digital filter can never apply gains or amplification to baseband signals, only that ‘the digital filters in Warner’s compensation units’ cannot do this because they are not supplied with coefficients that impart baseband signal amplification or gain.” Dkt. No. 100 at 8–9.

(2) Analysis

As to whether this term requires “one or more baseband amplifiers in each of the I and Q channels,” Plaintiff has cited the following disclosure in the specification:

The varying of differential I-Q gains in the transmit and receive chains can be effected in many ways. It can be applied in a true differential manner, although this is not necessary and it is generally simpler to vary either the I or Q gain while holding the other fixed.

’313 Patent at 10:42–47 (emphasis added). Although this discloses varying only one channel, this disclosure appears to presume that both channels are being amplified. This is consistent with disclosure of embodiments that include baseband amplifiers 14a and 14b that provide both I gain and Q gain. Also, Claims 7 and 16 separately recite “differential I-Q gain” and “a channel gain adjuster” in addition to the “baseband I-Q amplification subsystem.”

Defendants have not shown, however, that a separate amplifier is required for each channel. This is a specific feature of particular disclosed embodiments that should not be

imported into the claims. *See Comark*, 156 F.3d at 1187; *see also Phillips*, 415 F.3d at 1323.

The Court therefore rejects Defendants’ proposal of the word “each.”

As to whether Plaintiff disclaimed digital filters, Defendants have cited statements in the Patent Owner’s Preliminary Response submitted by Plaintiff in response to the Unified Patents IPR petition. *See Aylus*, 856 F.3d at 1362 (“statements made by a patent owner during an IPR proceeding, whether before or after an institution decision, can be considered for claim construction and relied upon to support a finding of prosecution disclaimer”). Defendants have highlighted the following statements by Plaintiff regarding the “Warner” reference:

. . . Warner does not disclose a baseband I-Q amplification subsystem, opting instead for a digital filter implementation without any baseband amplification.

* * *

. . . Warner’s FIR filters are not a “baseband I-Q amplification subsystem.”

* * *

The ’313 Patent discloses and claims amplifying baseband signals in the baseband transmit and receive chains. One of ordinary skill in the art would understand the baseband I-Q amplification subsystem to require some form of amplifier as part of the transmit and receive chains. *See EX2001* ¶ 65. However, Warner does not disclose such an amplifier in the baseband portion of its transceiver.

Petitioner wrongly relies on Warner’s digital filters in the Pre- and Post-Compensation Units (QMCSP 102 and QDCSP 112) as the claimed baseband amplification subsystems. Petition at 51–54. *A person of ordinary skill in the art would understand that a digital filter, alone, is not—and cannot be used as—a baseband amplifier. See EX2001* ¶ 66. Therefore, Warner’s compensation units (QMCSP/QDCSP)—which are comprised entirely of FIR filters—are not a baseband amplification subsystem. Petitioner’s argument that a digital filter is a baseband amplification subsystem is simply wrong.

Further, Petitioner’s statement that “Warner applies the gains (or amplification) digitally to the digital representations of the transmit [or receive] IQ baseband signals . . . by updating the parameters in QMCSP [or QDCSP] . . . like in the alternative embodiment of the ’313 Patent,” is incorrect for several reasons. Petition at 51–52, 53–54. First, as just explained, one of ordinary skill in the art would know that *the digital filters in Warner’s compensation units do not apply*

gains or amplification to baseband signals. Further, the parameters that are updated in the compensation units are the filter coefficients, which are not gains.

Dkt. No. 99, Ex. 10, Sept. 28, 2017 Patent Owner’s Redacted Preliminary Response at 3, 24 & 34–35 (emphasis added; square brackets in original).

As a threshold matter, Defendants have not shown that Plaintiff disclaimed *any* use of digital filters, although this does not appear to be Defendants’ argument. Defendants have argued: “The inclusion of superfluous digital filters is not what Red Rock disclaimed. What Red Rock has disclaimed is digital filters that satisfy the ‘baseband I-Q amplification subsystem’ limitation.” Dkt. No. 99 at 20.

Plaintiff explained, as set forth above, that a digital filter “alone” cannot be used as a baseband amplifier. Dkt. No. 99, Ex. 10, Sept. 28, 2017 Patent Owner’s Redacted Preliminary Response at 35. Plaintiff has argued that it distinguished specific structures in Warner, namely the QMCSP 102 and QDCSP 112,¹⁰ which Plaintiff stated “are comprised entirely of FIR filters.” *Id.* Nonetheless, Plaintiff explicitly stated that “[a] person of ordinary skill in the art would understand that a digital filter, alone, is not—and cannot be used as—a baseband amplifier.” *Id.* at 35.

At the April 3, 2018 hearing, Plaintiff urged that it could only have been distinguishing the specific filter implementation set forth in Warner because a person of ordinary skill would understand that a digital filter can be used as an amplifier. Yet, Plaintiff did not identify any statement to this effect in the prosecution history. Further, Plaintiff has not submitted any

¹⁰ Warner discloses “a quadrature modulator compensation signal processor (QMCSP) 102” and “a quadrature demodulator compensation signal processor (QDCSP) 112.” Dkt. No. 93, Ex. I at 6:11–12 & 6:14–15; *see id.* at 12:65–13:6 & 16:56–17:2.

evidence that a person of ordinary skill in the art would have the understanding that Plaintiff has suggested.

On balance, this prosecution history rises to the level of a “definitive statement[]” that digital filters alone are insufficient. *Omega Eng’g*, 334 F.3d at 1324; *see Andersen*, 474 F.3d at 1374.¹¹

The Court therefore hereby construes **“baseband I-Q amplification subsystem”** to mean **“one or more baseband amplifiers on the I and Q channels, wherein any such amplifier does not comprise only digital filters.”**

E. “the imbalanced chain”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
“a chain with a gain imbalance”	Indefinite

Dkt. No. 87, Ex. B at 3; Dkt. No. 93 at 23; Dkt. No. 99 at 21; Dkt. No. 107 at 5. The parties submit that this term appears in asserted Claims 6, 16, 32, 43, and 69. Dkt. No. 87, Ex. B at 3–4; Dkt. No. 93 at 23; Dkt. No. 99 at 21.

¹¹ *See Tech. Props. Ltd. LLC v. Huawei Techs. Co., Ltd.*, 849 F.3d 1349, 1359 (Fed. Cir. 2017):

Technology Properties presented clear and concise arguments about the distinctions between [the] Magar [reference] and the ’336 patent in its briefing to our court. Had those same arguments been made to the Patent Office, our construction may have been different because the patentee likely disclaimed more than was necessary to overcome the examiner’s rejection. But the scope of surrender is not limited to what is absolutely necessary to avoid a prior art reference; patentees may surrender more than necessary. *See Norian Corp. v. Stryker Corp.*, 432 F.3d 1356, 1361–62 (Fed. Cir. 2005); *Fantasy Sports Props., Inc. v. Sportsline.com, Inc.*, 287 F.3d 1108, 1114–15 (Fed. Cir. 2002). When this happens, we hold patentees to the actual arguments made, not the arguments that could have been made. *Norian*, 432 F.3d at 1361–62. The question is what a person of ordinary skill would understand the patentee to have disclaimed during prosecution, not what a person of ordinary skill would think the patentee needed to disclaim during prosecution.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “Claims 6, 43: Indefinite”; and “Claims 16, 32, 69: ‘a chain with an I-Q gain imbalance.’”

(1) The Parties’ Positions

Plaintiff argues that it is reasonably clear, despite the lack of explicit antecedent basis, that “[t]he word ‘imbalanced’ unambiguously refers to the claimed I-Q imbalance” and “[t]he word ‘chain’ unambiguously refers to the claimed transmit chain or receive chain” because there are no other “imbalances” or “chains” anywhere in the claims. Dkt. No. 93 at 24. Plaintiff further urges that there is no ambiguity because “‘the imbalanced chain’ refers to *one or more chains* with a gain imbalance.” *Id.*

Defendants respond: “The claims recite two chains: a transmit chain and a receive chain. Neither the claims at issue, nor the claims from which they depend, state which chain is imbalanced.” Dkt. No. 99 at 22. Defendants also argue that “Red Rock cannot rewrite the claims at this juncture, because the claims fail to meet the standard for judicial correction.” *Id.* at 23. Defendants further submit that “Red Rock submitted two certificates of corrections to the PTO for the ’313 Patent, including one specifically addressing errors in various claims,” and “Red Rock’s failure to include the claims at issue in the certificates suggests they were not drafting errors.” *Id.* at 23 n.6.

Plaintiff replies that “‘[t]he imbalanced chain’ plainly refers to ‘one or more’ of these chains.” Dkt. No. 100 at 9. Plaintiff argues that “[w]hen both chains are imbalanced, one can satisfy this limitation (‘varying the differential I-Q gain in the imbalanced chain’) by varying the differential I-Q gain in the imbalanced transmit chain, in the imbalanced receive chain, or in both chains.” *Id.*

(2) Analysis

The recitals of “the imbalanced chain” in Claims 6, 16, 32, 43, and 69 lack explicit antecedent basis, either in those claims themselves or in the claims from which they depend.¹² These claims recite “a transmit chain” and “a receive chain” but do not recite “an imbalanced chain” and do not otherwise explicitly recite which chain is “imbalanced.”

Claim 6, for example, depends from Claim 1, and Claims 1 and 6 recite (emphasis added):

1. A transceiver system for transmitting and receiving data using both I and Q channels, comprising:
 - a transmit chain;*
 - a receive chain;* and
 - a calibration subsystem comprising a signal path for injecting a calibration RF signal, generated in response to and as a function of a signal generated through the *transmit chain*, into the *receive chain* of the transceiver in order to independently calibrate the *I-Q gain balance* of the both *transmit and receive chains* in their entirety;
 - wherein the calibration RF signal includes a calibration cycle, and the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator while holding receive I-Q gain settings constant, and which in turn determines receiver I-Q gain settings which minimizes [*sic*] the observable indicator while holding the transmit I-Q gain settings constant.

* * *

6. A transceiver system according to claim 1, further including a channel gain adjuster for varying the differential I-Q gain in *the imbalanced chain* in response to the calibration signal being injected into the receiver chain.

In some cases, antecedent basis can be implicit. *See Energizer Holdings Inc. v. Int’l Trade Comm’n*, 435 F.3d 1366, 1371 (Fed. Cir. 2006) (holding that “an anode gel comprised of zinc as the active anode component” provided implicit antecedent basis for “said zinc anode”); *see also Ex Parte Porter*, 25 U.S.P.Q. 2d (BNA) 1144, 1145 (B.P.A.I. 1992) (“The term ‘the

¹² Claims 16, 32, and 69 are independent claims. Claims 6 and 43 are dependent claims and depend from Claims 1 and 38, respectively.

controlled fluid’ . . . finds reasonable antecedent basis in the previously recited ‘controlled stream of fluid’”).

The specification refers to “the imbalanced chain” in three instances but does not provide any guidance beyond what is recited in the claims. *See* ’313 Patent at 2:32–35, 3:17–19 & 4:34–35. The specification does disclose, however, that I-Q gain balance can be adjusted in either or both of the transmit and receive chains. *See id.* at 8:6–9.

But even in light of the specification, and even taking into account the recitals of “transmit” and “receive” chains in the context of calibration, the lack of antecedent basis renders the claim unclear. For example, “the imbalanced chain” could be read as referring to all recited chains, that is, both the transmit chain and the receive chain. Alternatively, “the imbalanced chain” could be read as referring to one or more chains, thus referring to either the transmit chain, the receive chain, or both. *See Free Motion Fitness, Inc. v. Cybex Int’l*, 423 F.3d 1343, 1350–51 (Fed. Cir. 2005) (“Like the words ‘a’ and ‘an,’ the word ‘the’ is afforded the same presumptive meaning of ‘one or more’ when used with the transitional phrase ‘comprising.’”). Still further, the term recites “chain” in the singular, and “the imbalanced chain” could be read as requiring that one and only one chain can be “the imbalanced chain.” *Cf. Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999) (meaning “depending on the context in which the article is used”). The *C-Cation* case cited by Plaintiff does not resolve these ambiguities. *See C-Cation Techs., LLC v. Time Warner Cable, Inc.*, No. 2:14-CV-59, Dkt. No. 102 at 34–36 (E.D. Tex. Apr. 20, 2015).

Moreover, not only is the claim unclear as to whether the constituent term “chain” has a meaning that is singular, plural, or both, the further limitation that the chain is “imbalanced” lacks any reasonably clear meaning in the context of this claim. At the April 3, 2018 hearing,

Plaintiff emphasized that Claim 1 recites an “I-Q gain balance,” but Plaintiff has failed to persuasively show that the recital of a “balance” necessarily provides antecedent basis for an “imbalance.”

On balance, the scope of Claim 6 lacks “reasonable certainty” because of the lack of antecedent basis. *Nautilus*, 134 S. Ct. at 2129. The Court therefore finds this claim indefinite. *See Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008) (“a claim could be indefinite if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable”) (citing *Energizer*, 435 F.3d at 1370–71). Substantially the same analysis also applies to Claim 43.¹³

Claim 16, by contrast, recites “a processor for processing the baseband receive calibration RF signal to form an observable indicator of *I-Q imbalance*” (emphasis added):

16. A transceiver system comprising:

A. a transmit chain including: a signal generator for generating a baseband transmit signal; baseband I-Q amplification subsystem for providing baseband amplification of the baseband transmit signal; direct-conversion subsystem for converting the baseband transmit signal to an RF transmit signal, and including an RF transmit signal port;

B. a receive chain including: an RF receive port for receiving an RF receive signal; direct-conversion subsystem for converting the RF receive signal to a baseband receive signal; baseband I-Q amplification subsystem for providing amplification of the baseband receive signal;

[a processor for]¹⁴ processing of the baseband receive signal as required for the normal function of the transceiver, and

C. a calibration subsystem including; a calibration RF signal generator for generating a calibration RF signal as a baseband transmit signal; a signal path for injecting the calibration RF signal from the RF transmit signal port to the RF receive signal port; a processor for *processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance*; and,

¹³ Defendants have also argued that the claims cannot be corrected by way of judicial correction because the interpretation proposed by Plaintiff is subject to reasonable debate. Dkt. No. 99 at 23. Because Plaintiff has not argued for judicial correction, the Court does not address Defendants’ arguments against judicial correction.

¹⁴ See Dkt. No. 93, Ex. A, Nov. 1, 2016 Certificate of Correction (p. 24 of 25 in Ex. A).

D. a channel gain adjuster for varying the differential I-Q gain in *the imbalanced chain*,

wherein the calibration RF signal includes a calibration cycle, and the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator while holding receive I-Q gain settings constant, and which in turn determines receiver I-Q gain settings which minimizes [*sic*] the observable indicator while holding the transmit I-Q gain settings constant.

Here, the recital of “the imbalanced chain” is preceded by a limitation that recites “an observable indicator of I-Q imbalance.” Claims 32 and 69 are similar in this regard. These claims thus provide reasonable certainty as to the meaning of “the imbalanced chain” as a chain with an I-Q gain imbalance as determined in other claim limitations. *See Nautilus*, 134 S. Ct. at 2129; *cf. Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1343 (Fed. Cir. 2008) (“the use of a definite article (‘said’ or ‘the’) to refer back to an initial indefinite article does not implicate, let alone mandate the singular”); *id.* at 1342 (“The subsequent use of definite articles ‘the’ or ‘said’ in a claim to refer back to the same claim term does not change the general plural rule, but simply reinvokes that non-singular meaning.”).

The Court therefore rejects Defendants’ indefiniteness arguments as to these claims. *See Sonix Tech. Co. v. Publications Int’l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017) (“Indefiniteness must be proven by clear and convincing evidence.”) (citation omitted).

The Court accordingly hereby construes this disputed term as set forth in the following chart:

<u>Term</u>	<u>Construction</u>
“the imbalanced chain” (Claims 6, 43)	Indefinite
“the imbalanced chain” (Claims 16, 32, 69)	“a chain with an I-Q gain imbalance”

F. “means for preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”

Plaintiff’s Proposed Construction	Defendants’ Proposed Construction
<p>Claimed Function: “preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”</p> <p>Corresponding Structure: “(i) a circuit layout forming the injection signal path designed to be approximately an odd multiple of 45°; or (ii) a phase-control element, such as phase control [140]”</p>	<p>Claimed Function: “preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”</p> <p>Corresponding Structure: “(i) a circuit layout forming the injection signal path designed to be approximately an odd multiple of 45°; or (ii) a phase-control element, such as phase control [140], <i>capable of two difference phase shift values differing by approximately 45 degrees</i>”</p>

Dkt. No. 87, Ex. B at 4–5; Dkt. No. 93 at 26; Dkt. No. 99 at 24–25 (emphasis Defendants’); Dkt. No. 107 at 7–8. The parties submit that this term appears in asserted Claims 8 and 23. Dkt. No. 87, Ex. B at 4; Dkt. No. 93 at 26; Dkt. No. 99 at 24–25.

Shortly before the start of the April 3, 2018 hearing, the Court provided the parties with the following preliminary construction: “Function: ‘preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive’”; “Corresponding Structure: ‘(i) a circuit layout forming the injection signal path designed to be approximately an odd multiple of 45°; or
(ii) phase control 140 capable of changing the phase by approximately 45° or capable of modulating the phase in the injection path so that the axes do not remain, on the average, in a degenerate alignment.’” At the hearing, Plaintiff agreed with the Court’s construction.

(1) The Parties' Positions

Plaintiff argues that “Samsung improperly proposes an additional functional capability not recited in the claim—‘capable of two difference phase shift values differing by approximately 45 degrees.’” Dkt. No. 93 at 27. Plaintiff also argues that Defendants’ proposal improperly “limits the phase-control element to one preferred embodiment while excluding another embodiment.” *Id.*

Defendants respond that “[a] generic phase-control is not linked to, and does not necessarily perform, the claimed function, because it may or may not be capable of selecting between two 45° phase shift values.” Dkt. No. 99 at 26. Defendants also argue that “Samsung’s construction does not import additional functions, but instead describes *how* the phase-control element is *configured* in order for it to be able to perform the claimed function.” *Id.* at 27. Further, Defendants argue that “Red Rock’s generic phase controller construction would improperly include phase control 130 as corresponding structure, even though phase control 130 is not linked to the claimed function.” *Id.* at 30.

Plaintiff replies that it is not proposing “any generic phase controller,” as Defendants argue, because “[b]oth parties’ constructions identify the same structure.” Dkt. No. 100 at 10. Plaintiff argues that Defendants’ proposal improperly excludes “another approach” disclosed as to the “phase control 140.” *Id.*

(2) Analysis

Title 35 U.S.C. § 112, ¶ 6 provides: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” “[S]tructure

disclosed in the specification is ‘corresponding’ structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.” *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1219 (Fed. Cir. 2003) (citation and internal quotation marks omitted).

The parties agree that the claimed function is “preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive.”

As Plaintiff has acknowledged, the corresponding structure at issue is not any generic phase control but rather is the particular disclosed phase control. *See, e.g., Mettler-Toledo, Inc. v. B-Tek Scales, LLC*, 671 F.3d 1291, 1295–96 (Fed. Cir. 2012) (“Although generic A/D converters were known in the art, the patentee chose to use means-plus-function language which limits it to the disclosed embodiments and equivalents.”). Nonetheless, “a court may not import functional limitations that are not recited in the claim, or structural limitations from the written description that are unnecessary to perform the claimed function.” *Wenger*, 239 F.3d at 1233.

The specification discloses as follows regarding “phase control 140”:

While the amplitude and phase characteristics for the calibration injection path are not critical, it is necessary to avoid phases which result in a net phase between the transmit and receive which is a multiple of 90°. This net phase includes the transmission phase of the injection path as well as differences in the LO phase.

FIG. 7a shows the overlay of transmit and receive gain ellipses in the degenerate case of 90° net phase rotation as the calibration signal goes from baseband in the transmit chain to baseband in the receive chain. When the principle axes of the two ellipses align, there can be a net gain balance in I and Q in going from transmit baseband to receive baseband, while at the same time the transmit and receive chains each can have substantial I-Q gain imbalance. Thus, with degenerate axis alignment the calibration could not produce a feature which ensures the ability to calibrate the transmit and receive chains independently.

FIG. 7b shows the non-degenerate case when the principle axes are not aligned. In this case both the transmit- and receive-chain gains must be individually balanced in order to achieve a gain vs. phase which is a circle.

There are various ways to avoid degeneracy in the alignment of the transmit and receive gain axes. If parameter control is adequate, the circuit layout in forming the injection signal path could be designed to be approximately an odd multiple of 45° . Alternatively, a modest phase-control element could be included in the injection path, and capable of two difference phase shift values differing by approximately 45° .

FIG. 8 depicts a preferred embodiment where calibration based upon a phasor calibration signal with phase selection using *phase control 140* is used to avoid degenerate alignment of the gain ellipses for transmit and receive. An initial calibration signal on one phase of the transmit baseband input should produce amplitudes in the receive baseband I and Q outputs which are of similar magnitude. If these magnitudes are too disparate, then existence of the nearly degenerate transmit/receiver phase alignment is indicated, and changing the phase by approximately $\pm 45^\circ$, is sufficient to guarantee non-degenerate phase alignment. This pre-calibration to avoid degenerate phase alignment could be performed for each calibration operation, or perhaps infrequently if parameters otherwise remain stable.

Yet another approach would be to modulate the phase in the injection path so that the axes do not remain, on the average, in a degenerate alignment. It is important to recognize the greater simplicity in this case, having to avoid a narrow range of phase shifts, compared to the earlier case in which the phase had to fall within a narrow range.

'313 Patent at 9:42–10:23 (emphasis added).

This passage thus discloses that “phase control 140” is capable of “changing the phase by approximately $\pm 45^\circ$,” but this passage also discloses “[y]et another approach” of “modulat[ing] the phase in the injection path so that the axes do not remain, on the average, in a degenerate alignment.” *Id.* at 10:13 & 10:18–20. The corresponding structure should include both of these alternatives. *See Ishida Co., Ltd. v. Taylor*, 221 F.3d 1310, 1316 (Fed. Cir. 2000); *see also Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) (“When multiple embodiments in the specification correspond to the claimed function, proper application of § 112, ¶ 6 generally reads the claim element to embrace each of those embodiments.”).

Defendants have argued that this disclosure regarding “another approach” merely “explains that, in addition to pre-calibration, the phase control element 140 can also be used to maintain calibration by selecting between the 45° phase shifts (*i.e.*, modulating the phase) during operation.” Dkt. No. 99 at 29 (emphasis omitted). Defendants have not persuasively shown how this disclosure restricts the “modulat[ing]” to being “selecting between the 45° phase shifts.” *Id.* The Court therefore rejects Defendants’ interpretation in that regard.

As to the proper articulation of the corresponding structure, Defendants have cited authority that the corresponding structure may include accompanying written description. *Tex. Digital Sys. v. Telegenic, Inc.*, 308 F.3d 1193, 1212–13 (Fed. Cir. 2002) (finding that the corresponding structure included the written description accompanying the figures in which the structures were illustrated), *abrogated on other grounds by Phillips*, 415 F.3d 1303. Also, Defendants have cited authority that where a specific structure is disclosed, the corresponding structure is not a generic structure. *See Bennett Marine, Inc. v. Lenco Marine, Inc.*, 549 F. App’x 947, 954 (Fed. Cir. Sept. 19, 2013) (rejecting corresponding structure of generic circuit because of absence of “any evidence showing that any circuit other than the circuit disclosed in figure 2 was known and capable of performing the function required”).

Here, however, the identification of “phase control 140” is sufficient to distinguish the corresponding structure from the “phase control 130” as to which Defendants have expressed concern. *See* Dkt. No. 99 at 30; *see also* ’313 Patent at 8:54–9:15 (“requires a total range of phase shift in excess of 90°, and precision in phase control consistent with the ultimate calibration accuracy required”). Nonetheless, some explanation of the disclosed configuration of phase control 140 is appropriate in light of the parties’ above-discussed dispute as to the “[y]et another approach” disclosure.

The Court therefore hereby finds that **“means for preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”** is a means-plus-function term, the claimed function is **“preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive,”** and the corresponding structure is **“(i) a circuit layout forming the injection signal path designed to be approximately an odd multiple of 45°; or (ii) phase control 140 capable of changing the phase by approximately 45° or capable of modulating the phase in the injection path so that the axes do not remain, on the average, in a degenerate alignment.”**

V. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. As set forth above, the Court finds that the term “the imbalanced chain” renders Claims 6 and 43 indefinite. The parties are ordered to not refer to each other’s claim construction positions in the presence of the jury. Likewise, in the presence of the jury, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court. The Court’s reasoning in this order binds the testimony of any witnesses, and any reference to the claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 16th day of April, 2018.


ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE

APPENDIX A

<u>Term</u>	<u>Parties' Agreement</u>
“calibrate” / “calibrating” (Asserted Claims 1, 38, 44, 59, 69)	“calibrate”: “observe and correct” “calibrating”: “observing and correcting”
“RF receive signal” (Asserted Claims 7, 16, 22, 32, 44, 59, 69)	“an external signal at radio frequency that is received by a receive chain”
“differential I-Q gain” (Asserted Claims 5–7, 16, 22, 32, 42–44, 59, 69)	“the difference in the gain of the I-channel compared to the gain in the corresponding Q-channel”
“amplification means for amplifying the transmit signal at the intermediate frequency” (Asserted Claims 31, 68)	Claimed function: “amplifying the transmit signal at the intermediate frequency” Corresponding structure: “amplifier 54, including its inputs and outputs, and equivalents”
“sampled phasor” (Asserted Claims 12, 18, 27, 34, 49, 64, 71)	No construction necessary; plain and ordinary meaning
“discrete phasor” (Asserted Claims 13, 19, 28, 35, 50, 65, 72)	No construction necessary; plain and ordinary meaning
“discrete phasor comprising j^n or j^{-n} ” (Asserted Claims 14, 20, 29, 36, 51, 66, 73)	No construction necessary; plain and ordinary meaning

Dkt. No. 87 at Ex. A; Dkt. No. 93 at 3–4.